OBJECTS OF THE TROPICAL RESEARCH STATION

By Henry Fairfield Osborn.

The main object of the Tropical Research Station from the beginning has been the *observation of living organisms in their natural environment.* To make this intensive and inclusive of the entire fauna, a single region has been selected and the fauna studied as a whole and in detail so far as possible through the expert knowledge of members of the staff and of the several experts who have been invited to work at the laboratory from time to time.

The work of the Station, therefore, is unique in two respects: First, its very intensive character; second, its restriction to a single locality on the border of a great zoological region, namely, the eastern tropical forests of the Amazonian basin. In many biological aspects it is new, in others it is the sequel to the long, distinguished period of exploration of this general region, beginning as early as 1812. The six best known explorers of eastern South America have been the following:

Charles Waterton, four voyages from 1812 to 1824, chiefly in Guiana.

Charles Darwin, 1832-1835, from Bahia around the entire South American coast to the Galapagos.

Alfred Russel Wallace, 1848-1852, the Amazon and Rio Negro.

Henry Walter Bates, 1848-1859, the Amazon basin from Para to Peru.

Thomas Belt, 1868, Nicaragua.

W. H. Hudson, born in Argentina seventy-odd years ago, and left for England about 1890.

To Waterton we owe the pioneer review of the life of this wonderful forest region; to Darwin, Wallace, Bates, and Belt the intimate relations of animals and plants with each other and with their environment, color and form adaptation, and struggle for existence; to Darwin and Hudson especially the complex chain of relations which connect the whole series of organisms together.

In the work of the Station it has been found absolutely necessary to lay a secure foundation in systematic zoology. For this purpose efforts are being made to complete and round out the faunal lists of various systematic workers in this region.

These lists will give a common language to the distinctive research feature of this Station, which, as remarked above, is intensive biologic observation in one region, in fact, in one locality, as distinguished from the observations of those who have covered and are covering the whole biologic field of South America.

The area chosen by our Honorary Curator of Birds, William Beebe, when he founded the Station in 1916, is the eastern edge of the tropical rain-forest of South America, which extends unbroken across the greater part of the continent. The fauna and flora are in general uniform with those of the entire Amazonian region. The locality at Kartabo, Bartica District, British Guiana, the point of junction of the Mazaruni and Cuyuni rivers, demonstrated in the first season its exceptional advantages as the site for a permanent station. Within ten minutes walk are sandy and rocky beaches, mangroves, grassland, swamp, and high jungle, each with a growth of life peculiar to itself. Free exposure to the trade winds, the absence of flies and mosquitos, invariably cool nights, excellent buildings assigned by the government—all these features contribute to the wide range of life and the unbroken health of the scientific staff. The work of the year 1916 was so full of promise that Mr. Beebe, then Curator of Birds of the New York Zoological Park, was promoted to the rank of Director of the Tropical Research Station and given entire charge both of the choice of the personnel and of the supervision of the scientific work.

The Station is now entering its sixth year. Owing to the difficulty of transportation at the time of the war, there was a

lapse during 1917, but work was resumed in 1918, continued in 1919, and the present VOLUME III of ZOOLOGICA opens the contributions of the year 1920-1921, which has proved to be the most productive of all.

The staff of specialists, artists and investigators has included in the course of the past six years the following persons:

WILLIAM BEEBE, *Director*, Columbia University and New York Zoological Society

General Evolutionary Problems in Ornithology and Ecology

IRVING W. BAILEY Harvard University
Relations of Ants to Certain Plants

T. DONALD CARTER, *Collector*, New York Zoological Society

ISABEL COOPER, *Artist* Bryn Mawr College

ALFRED EMERSON Cornell University
Life Histories of Kartabo Termites

GERTRUDE EMERSON University of Chicago
Anthropology

WINIFRED J. EMERSON, *Artist* Cornell University

J. F. M. FLOYD University of Glasgow
Parasites of Vertebrates

W. T. M. FORBES Cornell University
Organs of Hearing in Lepidoptera

H. GIFFORD University of Nebraska
Comparative Opthalmology

G. I. HARTLEY Cornell University
Relationships of Certain Non-oscine Birds

RACHEL HARTLEY, *Artist* New York

PAUL G. HOWES Bruce Museum
Studies in Hymenoptera

GEORGE W. HUNTER Carlton College
General Biology

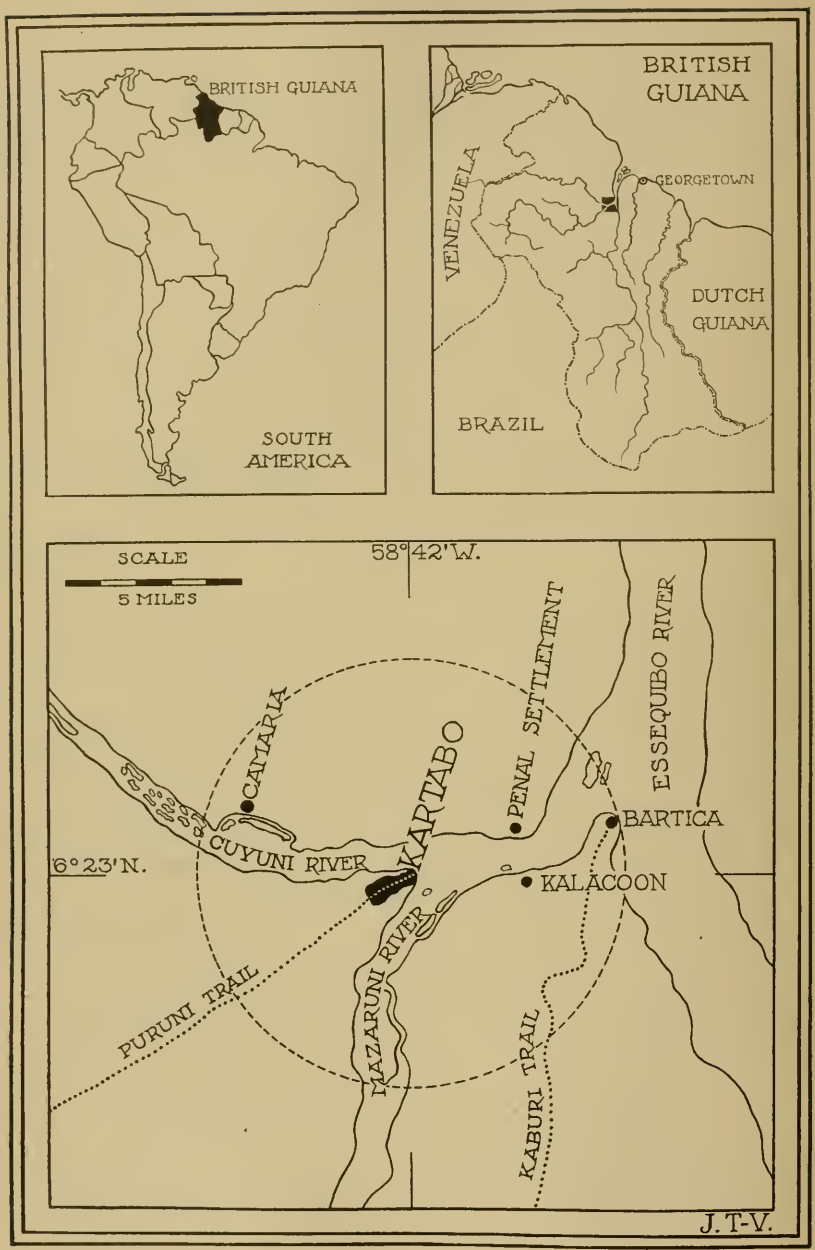

FIG. 2. LOCATION OF THE TROPICAL RESEARCH STATION OF THE NEW YORK ZOOLOGICAL SOCIETY

The circle represents a radius of six miles.

CLIFFORD POPE — University of Virginia
Life Histories of Kartabo Fish

ALBERT M. REESE — University of West Virginia
Embryology of Crocodiles and Investigation of Microscopical Beach Life

MABEL SATTERLEE — Columbia University
Coloration of *Ameiva* and Painting Optical Fundi

T. V. SMOLUCHA — New Jersey
Photography and Pen-and-Ink Drawing

ANNA TAYLOR — South Carolina
Botanical Paintings

JOHN TEE-VAN — New York Zoological Society
Ecology of Certain Lepidoptera

WM. MORTON WHEELER — Harvard University
Ants of Kartabo

C. A. WOOD — Leland Stanford University
Optical Fundi of Birds and Other Vertebrates

Ninety-three contributions have already been published from the Tropical Research Station, of which a complete annotated list is given in ZOOLOGICA III, No. 2. Of these eighty-nine are scientific papers and magazine articles, while four are included in the following bound volumes:

TROPICAL WILD LIFE IN BRITISH GUIANA, by Beebe, Hartley and Howes.

INSECT BEHAVIOR, by Paul G. Howes.

JUNGLE PEACE, by William Beebe.

EDGE OF THE JUNGLE, by William Beebe.

These published observations of the Station are so broad in scope that only a few salient features can be noted in this Introduction. They extend from color changes and adaptations to anatomical and physiological characters of the archaic forms of life, like the hoatzin, as well as of the most highly modernized and specialized forms. The colors of living amphibians and reptiles are almost an untouched field, since all modern systematic

zoology and description of these phyla have been founded on alcoholic specimens, in which the colors are either modified or lost altogether. It is only in the feathers of birds and in the coats of mammals that the natural color hues can be preserved. The paintings made directly from life by the artists of the Station, Miss Cooper and Miss Satterlee, will be published in a series of plate volumes accompanying the text volumes of ZOOLOGICA. The opportunity of studying the faunal and floral complex and the independent and interrelated adaptations in all grades of life, both in the vertical and in the horizontal life zones, opens up vistas for future research extending over many years. The vertical division of the fauna and flora into distinctive life zones, extending from the tree summits to the sub-soil, is a biologic contribution of first importance.

The Station was honored during the year 1920-1921 by the presence of Dr. Wm. Morton Wheeler, who makes an extremely important contribution to entomology in the present volume of ZOOLOGICA through his article on *A Study of Some Social Beetles in British Guiana and of Their Relations to the Ant-plant Tachigalia.*

Of the work of the Staff of the Research Station the following may be mentioned as having been accomplished to date:

Life History Notes on 445 species of birds, by Beebe and Hartley.

Life History Notes on 106 species of reptiles and amphibians, by Beebe.

One thousand five hundred and thirty-two photographic negatives, by Beebe, Howes, Tee-Van and Smolucha.

Ten thousand feet of moving picture film, by Tee-Van.

Collection of 340 water color drawings by Isabel Cooper.

Collection of types of 50 new species of termites.

Four hundred transparent preparations of embryos and tongues, etc.

Four hundred skeletons of mammals and birds.

Nests and eggs of 132 species of birds, many new to science.

Materials for a monograph on the syrinx and the voice of tropical birds.

Collection of 75,000 insects.

Collection of 776 bird skins.

Collection of 110 embryos of birds.

Materials for the study of the optical fundi of birds.

Monographic work on Trogons.

Cooperation with the Zoological Park, the Aquarium, the American Museum of Natural History, and Other Institutions

Besides the research work carried on at the Station there are three general lines of cooperation with other institutions. First, living organisms collected for the New York Zoological Park and the New York Aquarium, among which the most interesting forms are the following:

Birds

3 Cocks-of-the-Rock	*Rupicola rupicola* (Linné)
Hawk-headed Parrot	*Deroptyus accipitrinus accipitrinus* (Linné)
Imperial Amazon Parrot	*Amazona imperialis* (Richm.)
White-necked Rails	*Porzana albicollis* Vieill.
Bat Falcons	*Falco rufigularis rufigularis* Daud.
imThurn's Blackbird	*Agelaius imthurni* Sclater
Etc.	

Mammals

Silky Anteater	*Cyclopes didactylus didactylus* (Linné)
Tayra	*Tayra barbara barbara* (Linné)
2-toed Sloth	*Choloepus didactylus* (Linné)
3-toed Sloth	*Bradypus tridactylus* Linné
Spotted Cavy	*Agouti paca paca* (Linné)
Red Howling Monkey	*Alouatta seniculus macconnelli* Elliot
Jaguarondi	*Herpailurus jaguarondi unicolor* (Traill)
Wild Dog	*Cerdocyon thous thous* (Linné)
Etc.	

REPTILES	
8-foot Bushmaster	*Lachesis mutus* (Linné)
Iguanas	*Iguana iguana* (Linné)
White Amphisbena	*Amphisbena alba* Linné
Black and White Amphisbena	*Amphisbena fuliginosa* Linné
5 Crocodiles	*Caiman sclerops* (Schneid.)
Etc.	
AMPHIBIANS	
Marine Toads	*Bufo marinus* (Linné)
Five-fingered Jungle Frog	*Leptodactylus pentadactylus* (Laur.)
Sharp-nosed Toad	*Bufo typhonius* (Linné)
Harlequin Frogs	*Dendrobates* sp.
Etc.	
FISH	
Electric Eels	*Electrophorus electricus* (Linné)
Marbled Eel	*Symbranchus marmoratus* Bloch.
Perai	*Pygocentrus niger* (Schomb.)
Etc.	

Second, for the American Museum of Natural History, there has been brought together a collection of 485 mammals belonging to numerous species, preserved with their skins, skulls and skeletons. Many of these mammals are of especial interest because of the fact that most of the South American types of the great Swedish naturalist Linnaeus were brought originally from this region of the continent. Alcoholic collections of several hundred reptiles, amphibians and fish have been made, preserved, labeled, and shipped to the American museum.

Third, of especial significance is the collection of photographic and botanical material which, together with the actual specimens themselves, has been gathered and furnished to the Museum for large groups of Red Howling Monkeys, *Alouatta seniculus macconnelli* Elliot, and Hoatzin, *Opisthocomus hoazin* (P. L. S. Mull.).

Other institutions have been aided as follows: (1) Specimens have been supplied to the Embryological Laboratories of the Carnegie Institution at Johns Hopkins University, for study of the embryology of the Red Howling Monkey; (2) numerous electric eels have been captured and sent to Dr. Ulric Dahl-

gren at Princeton University, for investigation of the electric organs of these animals; (3) a large collection of birds in alcohol has been made for Dr. C. A. Wood, for future study, at Leland Stanford University, of the various structures of the eye.

ZOOLOGICAL SOCIETY, New York, July 12, 1921.